

## CLAIMS

What is claimed is:

- 5       1.       A method for marking a computer aided design drawing using a processing device, comprising:
  - finding a door gap in the drawing;
  - determining a room relative to said door gap; and
  - marking said drawing to indicate a room definition
- 10       2.       The method of claim 1 wherein the step of finding a door gap comprises determining a set of gap points separated by a threshold wall thickness.
- 15       3.       The method of claim 1 wherein the door is defined by at least three points, and the step of finding the door gap includes determining a gap line having a direction between at least two of the three points.
- 20       4.       The method of claim 1 wherein the method further includes the step of retrieving wall lines in the drawing.
- 25       5.       The method of claim 4 wherein the step of retrieving all wall lines in the drawing includes generating a temporary memory structure representing the wall lines comprising a collection of points and lines.
6.       The method of claim 5 wherein the memory structure is destroyed following the marking step.

7. The method of claim 1 wherein the method further includes the step of retrieving all door lines in the drawing.

5 8. The method of claim 7 wherein the step of retrieving all door lines in the drawing includes generating a temporary memory structure representing the door lines comprising a collection of points and lines.

9. The method of claim 1 wherein the method further includes the step of finding at least one gap line.

10 10. The method of claim 9 wherein the step of determining a room comprises selecting wall lines beginning at a point in the gap line and following the direction of the gap line.

15 11. The method of claim 10 wherein the step of determining a room further comprises selecting the left-most line for a next segment until the gap line is reached.

20 12. The method of claim 9 wherein the step of finding at least one gap line includes the steps of:

selecting a first and a second group of contact points for a door gap;  
determining edge points in each selected group; and  
marking a point at an edge of the first group and an edge point in the second group.

25 13. The method of claim 12 wherein the steps of selecting, determining and marking are repeated by reversing the first and second group of points.

14. The method of claim 1 wherein the step of marking comprises:

creating CAD polyline entities in the drawing.

15. The method of claim 1 wherein the step of marking includes the further step of removing door recesses.

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16. A method for automatically marking a computer aided design drawing using a processing device, comprising:

retrieving at least a set of door lines and a set of wall lines from the drawing;

creating a set of gap lines defining at least one door gap; and

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determining a room area relative to each gap line.

17. The method of claim 16 wherein the process includes the further step of repairing gap lines having a tolerance less than a wall thickness tolerance specified by a user.

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18. The method of claim 16 wherein the method further includes the step of determining a room area includes the step of removing collinear points.

19. The method of claim 16 further including the step of marking the drawing by creating CAD polyline entities.

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20. The method of claim 16 wherein the method further includes the step of simplifying the set of wall lines and door lines into respective temporary data structures, each data structure comprising a collection of points and lines representing the door lines and wall lines, respectively.

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21. The method of claim 16 further including the step, prior to the step of retrieving, of receiving user input on the location of wall lines in the drawing.

22. One or more processor readable storage devices having processor readable code embodied on said processor readable storage devices, said processor readable code for programming one or more processors to perform a method comprising the steps of:
- 5 finding a door gap in the drawing;  
determining a room relative to said door; and  
marking said drawing to indicate a room definition.
- 10 23. One or more processor readable storage devices according to claim 22 wherein the step of finding a door gap comprises code for performing the sub-steps of:
- selecting a first group of contact points and a second group of contact points;
- 15 following an outside edge of a first group of contact points until it reaches an edge that crosses between the groups;  
following the outside edge of the second group of contact points until it reaches a second edge that crosses between the groups;  
comparing the first and second crossings.
- 20 24. One or more processor readable storage devices according to claim 23 wherein the gap line is defined as the last point from the second group and an edge point in the first group.
- 25 25. One or more processor readable storage devices according to claim 23 wherein the step of selecting comprises selecting based on a wall thickness variable set by a user.

26. One or more processor readable storage devices according to claim 22 wherein the step of marking includes the step of removing door recesses.
- 5 27. One or more processor readable storage devices according to claim 22 wherein the step of marking further includes the step of removing collinear points.
28. One or more processor readable storage devices according to claim 22 further including the step of reforming arc segments.
- 10 29. One or more processor readable storage devices according to claim 22 further including the step of creating CAD polyline entities for each of said room definitions.
- 15 30. One or more processor readable storage devices according to claim 22 further including the step of:  
assigning a parent child hierarchy to each of said room definitions.
- 20 31. One or more processor readable storage devices according to claim 30 wherein the parent child hierarchy is determined based on access through a single door.
- 25 32. A drawing analysis application operable on a processing device including, comprising code for instructing a processor to perform the steps of:  
creating at least one temporary data structure storing drawing information;  
determining from the temporary data structure door gaps in the drawing;  
successively determining walls of a room relative to the door gap; and

creating a room definition based on said step of successively determining.

33. A system for marking a drawing, comprising:  
5 a processing device;  
non-volatile memory coupled to the processing device instructing the processing device to perform the steps of:  
finding at least one reference vector in the drawing;  
determining an area definition based on drawing data relative to said  
10 reference; and  
marking said drawing to indicate a area definition.

34. A method for marking a computer aided design drawing using a processing device, comprising:  
15 finding at least one reference vector in the drawing;  
determining an area definition based on drawing data relative to said reference vector; and  
marking said drawing to indicate a area definition.

20 35. The method of claim 34 wherein the step of finding a reference vector comprises defining a door gap.

36. The method of claim 34 wherein the step of determining an area definition comprises defining a virtual area definition.

25 37. The method of claim 34 wherein the drawing data relative to the reference is a wall line.

38. The method of claim 34 wherein the step of finding includes the step of creating at least one temporary memory structure representing the drawing data.

5 39. The method of claim 38 wherein the temporary memory structure includes a representation of the door or wall lines comprising a collection of points and lines.

40. The method of claim 34 wherein the step of marking comprises:  
creating CAD polyline entities in said drawing data.

10 41. An application for a computer comprising an automated virtual area mark-up process.